

**DEVICE FOR REMOVABLY FIXING AND DRIVING A
DENTAL INSTRUMENT IN THE HEAD OF A HANDPIECE**

The present invention relates to a device for removably
fixing and driving a tooth tool in the head of a
5 handpiece, also called a contra-angle.

This invention applies to the field of dental
handpieces or contra-angles, and more particularly to
the field of devices for removably fixing tooth tools
to the handpieces.

10 The tooth tools intended to be used on handpieces are
generally provided with shanks complying with ISO 1797.

There are many means available for removably fixing the
tooth tools to the handpieces, in particular in the
patent EP 0 174 695 filed by the present applicant,
15 describing a device that allows the tooth tool to be
fixed axially.

This type of device permits good fixing and good
rotation of the tooth tool, but has the disadvantage of
taking up considerable space, which obstructs the
20 practitioner's view.

Rapid developments are presently taking place in the
field of dentistry performed under a microscope. It is
therefore essential for the practitioner to have
maximum visibility and accessibility, hence the need
25 for fixing and driving means that take up as little
space as possible.

This applies to dentistry performed under a microscope,
but it also applies to conventional dental work carried
out by direct sight, since the view of the teeth and
30 the access to them are better, the smaller the space
taken up by the driving and fixing means. This is
particularly the case in endodontic treatments of the
back teeth.

The invention aims to overcome these various disadvantages by making available a device for removably fixing and driving tooth tools on a handpiece of small size, permitting in particular the formation
5 of contra-angle heads of very small dimension that are able to receive standard shanks.

To this end, the subject of the present invention is a device for removably fixing a tooth tool to a head of a handpiece, said handpiece being formed by a handle, a
10 neck and a head, each of these parts being provided in its inside with a drive shaft, characterized in that said tool is disposed in a bore formed in the head of the handpiece, and in that it is held inside said bore by the contact with the drive shaft.

15 The invention will be better understood with reference to the attached drawings, in which:

- Figure 1 is a bottom view of the handpiece according to a first embodiment of the invention,
- Figure 2 is a cross-sectional view of the
20 handpiece in which the tooth tool is fitted according to a first embodiment of the invention,
- Figure 3 is a bottom view of a second embodiment of the handpiece with an external system for disengagement of the drive shaft,
- 25 - Figure 4 is a cross-sectional view of the second embodiment of the handpiece according to the invention.

The handpieces (1) or contra-angles are generally made up of an anterior part or neck (2) of cylindrical/
30 conical outer shape supporting the head (3) in which the tooth tool (4) is fixed, and of a handle (5) having

a shape which is substantially cylindrical and/or conical in revolution.

Each of these parts is provided in its inside with a drive shaft (6) ensuring the rotation of the tooth tool
5 (4).

The shank of the tooth tool (4) fits in the head (3) of the handpiece in a bore (7) formed in the transverse axis of the head (3).

The shank of the tooth tool (4) is in direct contact
10 with one of the ends of the drive shaft (6), thus ensuring rotation of the tool (4).

The point of contact between the shank of the tool (4) and the drive shaft (6) is situated in the area of a gear (8).

15 This gear (8) will preferably be inclined on the sides in order to match the shape of the tool (4).

Furthermore, this inclination of the gear (8) also allows the tool (4) to be pushed to the bottom of the bore (7) during rotation of this tool (4), thus
20 permitting good fixing of the latter.

Moreover, if the point of contact between the drive shaft (6) and the tool (4) is offset, the mechanical forces of the rotation push the instrument toward the bottom of the head (3), thus avoiding the risk of the
25 tool (4) escaping.

According to an advantageous characteristic of the invention, the drive shaft (6) is provided with a rubber shroud, ensuring the rotation movement. These rotation movements will be of the friction type.

30 According to a first embodiment, the drive shaft is

provided with a spring device (9) in the area of the handle (5). This device (9) is situated on the upper face of the drive shaft (6). It ensures the tool can be fitted in place by simple pushing of the drive shaft
5 (6).

Thus, when the tooth tool (4) is introduced into the bore (7) of the head (3) of the handpiece (1), it pushes on the drive shaft (6), which draws back by way of this spring device (9).

10 Likewise, upon disengagement of the tool (4) from the head (3) of the handpiece (1), the drive shaft (6) is pushed toward the front of the head (3) by this spring device (9).

According to a second embodiment of the device
15 according to the invention, in order to disengage the drive shaft (6) from the head (3) of the handpiece (1), the latter can be provided with a device (10) controlling the engagement or disengagement of the tooth tool (4).

20 This device is situated on the outer upper face in the area of the neck (2) of the handpiece (1). It is formed by a ring (11) placed on the neck (2) of the handpiece (1).

This ring (11) is provided with a stub (12) which
25 drives the shaft (6) in the direction of disengagement by virtue of a groove (13) situated in the shaft (6).

The drive shaft (6) engages in the head (3) by virtue of the spring device (9) described above in connection with the first embodiment of the invention.

30 The drive shaft (6) is situated in a longitudinal axis in relation to the handpiece (1), in contrast to the axis of the bore (7) receiving the tool (4), which axis

is a transverse axis. These differences in plane allow the tool (4) to fit securely at the bottom of the bore (7) by virtue of the forces created by the drive shaft (6) during its rotation. This is accentuated by the
5 gear (8) situated at the end of the shaft (6) in contact with the tool (4).

Moreover, these differences in plane allow the drive shaft (6) to be fitted with slight play. During its rotation, the shaft (6) is then situated in an offset
10 position relative to the tool (4). This offset pushes the tool (4) to the bottom of the head (3), thereby avoiding escape of said tool (4).

Moreover, to ensure that this device functions both in rightward rotation and leftward rotation, it suffices
15 to give the axis of the drive shaft (6) some play in its seat in such a way that it independently takes up an offset position during the rotation.

Although the invention has been described on the basis of specific parts, it comprises all technical
20 equivalents of the parts described.